

## AMENDED CLAIMS

[received by the International Bureau on 2 February 1998 (02.02.98);  
original claim 2 amended; remaining claims unchanged (5 pages)]

WHAT IS CLAIMED IS:

1. An isolated nucleic acid encoding a monomer of a calcium-activated potassium channel, said monomer:
  - i. having a calculated molecular weight of between 40 and 80 kDa;
  - ii. having a unit conductance of between 2 and 60 pS when the monomer is in the functional polymeric form of a potassium channel and is expressed in a *Xenopus* oocyte; and;
  - iii. specifically binding to antibodies generated against SEQ ID NOS:30 or 42.
2. An isolated nucleic acid encoding at least 15 contiguous amino acids from a calcium-activated potassium channel protein, said protein having a sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:32, SEQ ID NO:43, SEQ ID NO:47 and conservatively modified variants thereof, with the proviso that the contiguous amino acids do not consist of a glutamine repeat amino acid sequence.
3. The isolated nucleic acid of claim 2 wherein said nucleic acid encodes a calcium activated potassium channel protein having a conductance of between 2 and 60 pS and a molecular weight of between 40 and 80 kilodaltons and  
wherein said nucleic acid either
  - i. selectively hybridizes under moderate stringency hybridization conditions to a sequence selected from the group consisting of SEQ ID NOS:13, 14, 15, 16, 21, 22, 31, 44, and 48, or
  - ii. encodes a protein which could be encoded by a nucleic acid that selectively hybridizes under moderate stringency hybridization conditions to a sequence selected from the group consisting of SEQ ID NOS:13, 14, 15, 16, 21, 22, 31, 44, and 48.

4. The isolated nucleic acid of claim 1, wherein said nucleic acid encodes a protein having a sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:32, and SEQ ID NO:47.

5. The isolated nucleic acid of claim 1, wherein said nucleic acid encodes a protein having a sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, and SEQ ID NO:43.

6. An isolated nucleic acid of claim 1 wherein the sequence is identical to a naturally occurring sequence.

7. An isolated nucleic acid of claim 1 having the sequence depicted in SEQ ID NO:31.

8. An isolated nucleic acid of claim 1 encoding at least 15 contiguous amino acids of a monomer of an intermediate conductance, calcium-activated potassium channel, said monomer:

- i. having a calculated molecular weight of about 42 to 52 kDa;
- ii. having units conductance of between 30 and 60 pS in the inward direction when the monomer is in the functional polymeric form of a potassium channel and is expressed in a *Xenopus* oocyte; and,
- iii. specifically binding to a polyclonal antibody generated against SEQ ID NO:32.

9. An isolated nucleic acid of claim 8 wherein the sequence is identical to a naturally occurring sequence.

10. An isolated nucleic acid of claim 6 encoding any 8 contiguous amino acids from the following sequence:

VRGPPCVQDLGAPLTSPQPWPGFLGQGEAL (SEQ ID NO:33).

11. An isolated nucleic acid sequence of at least 20 nucleotides in length which specifically hybridizes, under stringent conditions, to a nucleic acid

encoding an intermediate calcium-activated potassium channel protein, said protein selected from the group consisting of SEQ ID NO:32.

12. An isolated calcium-activated potassium channel protein having at least 15 contiguous amino acids from a sequence selected from the group consisting of: SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:32, SEQ ID NO:43, SEQ ID NO:47 and conservatively modified variants thereof, wherein said variants specifically react, under immunologically reactive conditions, with an antibody reactive to a protein selected from the group consisting of: SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:32, SEQ ID NO:43, and SEQ ID NO:47.

13. The isolated calcium-activated potassium channel protein of claim 12, wherein said protein when expressed in a *Xenopus* oocyte leads to formation of an calcium-activated potassium channel having a conductance of between 2 and 80 pS and a molecular weight of between 40 and 80 kilodaltons.

14. The isolated calcium-activated potassium channel protein of claim 12, wherein said protein has a sequence shown in SEQ ID NO:1, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:32 or SEQ ID NO:47.

15. The isolated calcium-activated potassium channel protein of claim 12, wherein said protein has a sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, and SEQ ID NO:43.

16. An isolated protein of claim 12 comprising at least 15 contiguous amino acids from a monomer of a calcium-activated potassium channel protein having

- i. having a calculated molecular weight of about 42 to about 52 kDa;
- ii. having units conductance of between 30 and 60 pS in the inward direction when the monomer is in the functional polymeric form of a potassium channel and is expressed in a *Xenopus* oocyte; and;

iii. specifically binding to a polyclonal antibody generated against  
SEQ ID NO:32.

17. An isolated protein of claim 16 having an amino acid sequence  
identical to a naturally occurring sequence.

18. An isolated protein of claim 16 having the sequence depicted in  
SEQ ID NO:32.

19. An isolated nucleic acid of claim 16 encoding any 8 contiguous  
amino acids from the following sequence:

VRGPPCVQDLGAPLTSPQPWPGFLGQGEAL (SEQ ID NO:33).

20. An isolated intermediate conductance calcium-activated  
potassium channel protein encoded by a nucleic acid a portion of which when  
amplified by primer pairs produces an amplified fragment which selectively  
hybridizes, under stringent hybridization conditions to SEQ ID NO:31 wherein said  
primer pairs are selected from the group consisting of:

5' GCCGTGCGTGCCAGGATTTAGG 3' (SEQ ID NO:34)

5' CCAGAGGCCAAGCGTGAGGCC 3' (SEQ ID NO:35);

5' TCCAAGATGCACATGATCCTG 3' (SEQ ID NO:36); and,

5' GGA CTGCTGGCTGGGTTCTGG 3' (SEQ ID NO:37).

21. An antibody specifically reactive, under immunologically  
reactive conditions, to a calcium-activated potassium channel protein, said protein  
having a sequence selected from the group consisting of: SEQ ID NO:1, SEQ ID  
NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:19, SEQ ID NO:20, SEQ ID  
NO:32, SEQ ID NO:43, and SEQ ID NO:47.

22. An antibody of claim 21, wherein said antibody is specifically  
reactive to the protein selected from the group consisting of SEQ ID NO:1, SEQ  
ID NO:19, SEQ ID NO:20, SEQ ID NO:32, and SEQ ID NO:47.

23. An antibody of claim 21, wherein said protein has a sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, and SEQ ID NO:43.

24. The antibody of claim 21, wherein said antibody is a monoclonal antibody.

25. The antibody of claim 24, wherein said monoclonal antibody is specifically reactive to a protein selected from the group consisting of SEQ ID NO:1, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:32, and SEQ ID NO:47.

26. An expression vector comprising a nucleic acid encoding a calcium-activated potassium channel protein, said channel protein having a sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:32, SEQ ID NO: 43, and SEQ ID NO: 47, and conservatively modified variants thereof, wherein said conservatively modified variant is a protein which when expressed in an oocyte leads to formation of a calcium-activated potassium channel having a conductance of between 2 and 80 pS, a molecular weight of between 40 and 80 kilodaltons, and specifically reacts, under immunologically reactive conditions, with an antibody reactive to the channel protein selected from the group consisting of: SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:32, SEQ ID NO:43, and SEQ ID NO:47.

27. A host cell transfected with the vector of claim 26.

28. An isolated nucleic acid sequence of at least 20 nucleotides in length which specifically hybridizes, under stringent conditions, to a nucleic acid encoding a calcium-activated potassium channel protein, said protein selected from the group consisting of SEQ ID NO:1, SEQ ID NO:2, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:32, SEQ ID NO:43, and SEQ ID NO:47.